

**THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Appellants: Johnson et al.  
Appl. No.: 10/705,481  
Filed: November 10, 2003  
Title: ORAL PRODUCTS CONTAINING NOVEL FLAVOR COMPOSITION  
Art Unit: 1612  
Conf. No. 5154  
Examiner: Roberts, Lezah  
Docket No.: 112703-306

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPELLANTS' APPEAL BRIEF**

Sir:

Appellants submit this Appeal Brief in support of the Notice of Appeal filed on March 2, 2009. This Appeal is taken from the Final Rejections in the Office Action dated December 1, 2008.

**I. REAL PARTY IN INTEREST**

The real party in interest for the above-identified patent application on Appeal is Wm. Wrigley Jr. Company by virtue of Assignments dated March 8, 2004 and recorded at reel 015158, frames 0072-0076 in the United States Patent and Trademark Office.

## **II. RELATED APPEALS AND INTERFERENCES**

Appellants' legal representative and the Assignee of the above-identified patent application do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision with respect to the above-identified Appeal.

### **III. STATUS OF CLAIMS**

Claims 1, 4, 7-11, 14, 18-21 and 24-33 are pending in the above-identified patent application. Claims 2-3, 5-6, 12-13, 15-17 and 22-23 were previously canceled, and Claims 21 and 24-26 were previously withdrawn from consideration. Claims 1, 4, 7-11, 14, 18-20 and 27-33 stand rejected. Therefore, Claims 1, 4, 7-11, 14, 18-20 and 27-33 are being appealed in this Brief. A copy of the appealed claims is included in the Claims Appendix.

#### **IV. STATUS OF AMENDMENTS**

A Non-Final Office Action was mailed on February 5, 2008. In the Non-Final Office Action, the Patent Office rejected the claims under 35 U.S.C. §§ 112 and 103. Appellants filed a response to the Non-Final Office Action on August 13, 2008. A Final Office Action was mailed on December 1, 2008. In the Final Office Action, the Patent Office withdrew the rejections under 35 U.S.C. § 112 and but maintained the obviousness rejection. Appellants filed a Notice of Appeal on March 2, 2009 with respect to the Final Office Action mailed on December 1, 2008. Copies of the Non-Final Office Action mailed on February 5, 2008 and the Final Office Action mailed on December 1, 2008 are attached as Exhibits A and B, respectively, in the Evidence Appendix.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

A summary of the invention by way of reference to the specification and/or figures for each of the independent claims is provided as follows:

Independent Claim 1 recites a consumable oral product (Abstract, lines 2-5; page 1, paragraph 4, lines 4-10; paragraph 6, lines 1-3; paragraphs 7-9) comprising Erospicata oil (page 1, paragraph 4, lines 4-10; paragraph 11), an effective amount of menthol (page 2, paragraph 19; page 6, paragraph 68; Tables 2 and 6), a cooling agent (page 1, paragraph 4, lines 10-12; paragraph 12; paragraph 14, lines 1-3 and 5-8; paragraph 15, lines 3-9; page 2, paragraph 20, lines 2-5; paragraph 22, lines 5-6, 9-10, 12-14 and 16-17; page 5, paragraph 54, lines 8-9, 11-12, 14-15 and 17-21; page 8, paragraph 77, lines 7-8, 10-11 and 13-15; paragraphs 86-88; Tables 1-9) and a heating agent (page 1, paragraph 5, lines 6-9; paragraph 13; page 3, paragraph 46, lines 3-9; Tables 2 and 5-6), wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total consumable oral product (page 1, paragraph 14, lines 1-7; page 2, paragraphs 16-18; paragraph 22, lines 3-12 and 14-16; page 5, paragraph 54; page 8, paragraph 77, lines 1-6 and 8-13; Tables 1-6), and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof (page 1, paragraph 13, lines 6-10 and 12-16).

Independent Claim 11 recites a chewing gum product (page 1, paragraph 4, lines 6-10; paragraph 5, lines 1-6; paragraph 6; page 2, paragraph 20; paragraph 21, lines 3-6; paragraphs 22-25; page 3, paragraphs 34-41 and 43-46; Tables 1-2) comprising Erospicata oil (page 1, paragraph 4, lines 4-10; paragraph 11), an effective amount of menthol (page 2, paragraph 19; Tables 2 and 6), a cooling agent (page 1, paragraph 4, lines 10-12; paragraph 12; paragraph 14, lines 1-3 and 5-8; paragraph 15, lines 3-9; page 2, paragraph 20, lines 2-5; paragraph 22, lines 5-6, 9-10, 12-14 and 16-17; page 8, paragraph 77, lines 7-8, 10-11 and 13-15; paragraphs 86-88; Tables 1-2 and 6-9) and a heating agent (page 1, paragraph 5, lines 6-9; paragraph 13; page 3, paragraph 46, lines 3-9; Tables 2 and 6), wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product (page 1, paragraph 14, lines 1-7; page 2, paragraphs 16-18; paragraph 22, lines 3-12 and 14-16; page 8, paragraph 77, lines 1-6 and 8-13; Tables 1-2 and 6), and wherein the heating agent is chosen from the group consisting of

capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof (page 1, paragraph 13, lines 6-10 and 12-16).

Independent Claim 27 recites a method of enhancing a flavor in an oral consumable product (page 1, paragraph 4, lines 1-2; paragraph 12, lines 1-5; page 6, paragraph 69, lines 1-2) comprising the steps of adding to a consumable oral product Erospicata oil (page 1, paragraph 4, lines 4-10; paragraph 11), an effective amount of menthol (page 2, paragraph 19; page 6, paragraph 68; Tables 2 and 6), a heating agent (page 1, paragraph 5, lines 6-9; paragraph 13; page 3, paragraph 46, lines 3-9; Tables 2 and 5-6) and a cooling agent (page 1, paragraph 4, lines 10-12; paragraph 12; paragraph 14, lines 1-3 and 5-8; paragraph 15, lines 3-9; page 2, paragraph 20, lines 2-5; paragraph 22, lines 5-6, 9-10, 12-14 and 16-17; page 5, paragraph 54, lines 8-9, 11-12, 14-15 and 17-21; page 8, paragraph 77, lines 7-8, 10-11 and 13-15; paragraphs 86-88; Tables 1-9), wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total oral consumable product (page 1, paragraph 14, lines 1-7; page 2, paragraphs 16-18; paragraph 22, lines 3-12 and 14-16; page 5, paragraph 54; page 8, paragraph 77, lines 1-6 and 8-13; Tables 1-6), and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof (page 1, paragraph 13, lines 6-10 and 12-16).

Independent Claim 32 recites a method of producing a chewing gum product (page 1, paragraph 4, lines 6-10; paragraph 5, lines 1-6; paragraph 6; page 2, paragraph 20; paragraph 21, lines 3-6; paragraphs 22-25; page 3, paragraphs 34-47; page 4, paragraphs 48-51; Tables 1-2) comprising the steps of adding to a composition that includes a gum base (page 2, paragraph 21, lines 1-6; paragraphs 23- 33), Erospicata oil (page 1, paragraph 4, lines 4-10; paragraph 11), an effective amount of menthol (page 2, paragraph 19; Tables 2 and 6), a cooling agent (page 1, paragraph 4, lines 10-12; paragraph 12; paragraph 14, lines 1-3 and 5-8; paragraph 15, lines 3-9; page 2, paragraph 20, lines 2-5; paragraph 22, lines 5-6, 9-10, 12-14 and 16-17; page 8, paragraph 77, lines 7-8, 10-11 and 13-15; paragraphs 86-88; Tables 1-2 and 6-9) and a heating agent (page 1, paragraph 5, lines 6-9; paragraph 13; page 3, paragraph 46, lines 3-9; Tables 2 and 6), wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product (page 1, paragraph 14, lines 1-7; page 2, paragraphs 16-18; paragraph 22, lines 3-12

and 14-16; page 8, paragraph 77, lines 1-6 and 8-13; Tables 1-2 and 6), and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof (page 1, paragraph 13, lines 6-10 and 12-16).

Independent Claim 33 recites a method of reducing the amount of peppermint flavor required to achieve an organoleptic effect in a product (Abstract, lines 1-2; page 1, paragraph 5, lines 1-6; paragraph 11, lines 1-12) comprising the steps of manufacturing the product with Erospicata oil (page 1, paragraph 4, lines 4-10; paragraph 11), an effective amount of menthol (page 2, paragraph 19; page 6, paragraph 68; Tables 2 and 6), a cooling agent (page 1, paragraph 4, lines 10-12; paragraph 12; paragraph 14, lines 1-3 and 5-8; paragraph 15, lines 3-9; page 2, paragraph 20, lines 2-5; paragraph 22, lines 5-6, 9-10, 12-14 and 16-17; page 5, paragraph 54, lines 8-9, 11-12, 14-15 and 17-21; page 8, paragraph 77, lines 7-8, 10-11 and 13-15; paragraphs 86-88; Tables 1-9) and a heating agent (page 1, paragraph 5, lines 6-9; paragraph 13; page 3, paragraph 46, lines 3-9; Tables 2 and 5-6), wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product (page 1, paragraph 14, lines 1-7; page 2, paragraphs 16-18; paragraph 22, lines 3-12 and 14-16; page 5, paragraph 54; page 8, paragraph 77, lines 1-6 and 8-13; Tables 1-6), and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof (page 1, paragraph 13, lines 6-10 and 12-16).

Although specification citations are given in accordance with C.F.R. 1.192(c), these reference numerals and citations are merely examples of where support may be found in the specification for the terms used in this section of the Brief. There is no intention to suggest in any way that the terms of the claims are limited to the examples in the specification. As demonstrated by the reference numerals and citations, the claims are fully supported by the specification as required by law. However, it is improper under the law to read limitations from the specification into the claims. Pointing out specification support for the claim terminology as is done here to comply with rule 1.192(c) does not in any way limit the scope of the claims to those examples from which they find support. Nor does this exercise provide a mechanism for circumventing the law precluding reading limitations into the claims from the specification. In

short, the reference numerals and specification citations are not to be construed as claim limitations or in any way used to limit the scope of the claims.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 1, 4, 7-11, 14, 18-20 and 27-33 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2002/0119231 A1 to Kumamoto et al. (“*Kumamoto*”) in view of U.S. Patent No. Plant 8,645 to Sturtz (“*Sturtz*”). Copies of *Kumamoto* and *Sturtz* are attached herewith as Exhibits C and D, respectively, in the Evidence Appendix.

## VII. ARGUMENT

### A. LEGAL STANDARDS

#### Obviousness under 35 U.S.C. §103

The Federal Circuit has held that the legal determination of an obviousness rejection under 35 U.S.C. § 103 is:

whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made...The foundational facts for the *prima facie* case of obviousness are: (1) the scope and content of the prior art; (2) the difference between the prior art and the claimed invention; and (3) the level of ordinary skill in the art...Moreover, objective indicia such as commercial success and long felt need are relevant to the determination of obviousness...Thus, each obviousness determination rests on its own facts.

*In re Mayne*, 41 U.S.P.Q. 2d 1451, 1453 (Fed. Cir. 1997).

In making this determination, the Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q. 2d 1955, 1956 (Fed. Cir. 1993). This burden may only be overcome “by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings.” *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). “If the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.” *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1444 (Fed. Cir. 1992).

Moreover, the Patent Office must provide explicit reasons why the claimed invention is obvious in view of the prior art. The Supreme Court has emphasized that when formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. *KSR v. Teleflex*, 127 S. Ct. 1727 (2007).

Of course, references must be considered as a whole and those portions teaching against or away from the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986). “A prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference would be discouraged

from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Applicant.” *Monarch Knitting Machinery Corp. v. Fukuhara Industrial Trading Co., Ltd.*, 139 F.3d 1009 (Fed. Cir. 1998), quoting, *In re Gurley*, 27 F.3d 551 (Fed. Cir. 1994).

Further, the Federal Circuit has held that it is “impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch*, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992). “One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

B. THE CLAIMED INVENTION

Independent Claim 1 recites, in part, a consumable oral product comprising Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent. The Erospicata oil comprises about 0.01% to about 5% by weight of the total consumable oral product. The heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

Independent Claim 11 is directed to a chewing gum product comprising Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent. The Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product. The heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

Independent Claim 27 recites, in part, a method of enhancing a flavor in an oral consumable product comprising the steps of adding to a consumable oral product Erospicata oil, an effective amount of menthol, a heating agent and a cooling agent. The Erospicata oil comprises about 0.01% to about 5% by weight of the total oral consumable product. The heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

Independent Claim 32 is directed to a method of producing a chewing gum product comprising the steps of adding to a composition that includes a gum base, Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent. The Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product. The heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

Independent Claim 33 recites, in part, a method of reducing the amount of peppermint flavor required to achieve an organoleptic effect in a product comprising the steps of manufacturing the product with Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent. The Erospicata oil comprises about 0.01% to about 5% by weight of the total product. The heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

C. THE REJECTION OF CLAIMS 1, 4, 7-11, 14, 18-20 AND 27-33 UNDER 35 U.S.C. §103(a) TO KUMAMOTO AND STURTZ SHOULD BE REVERSED BECAUSE THE PATENT OFFICE HAS NOT ESTABLISHED A PRIMA FACIE CASE OF OBVIOUSNESS

1. The claims require a product comprising Erospicata oil, an effective amount of menthol and a cooling agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product

Appellants respectfully submit that the cited references fail to disclose or suggest every element of the presently pending claims. Independent Claims 1 and 11 recite, in part, a product comprising Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product. Similarly, independent Claims 27 and 32 recite, in part, a method comprising the steps of adding to a product Erospicata oil, an effective amount of menthol, a heating agent and a cooling agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product.

Independent Claim 33 recites, in part, a method of reducing the amount of peppermint flavor required to achieve an organoleptic effect in a product comprising the steps of manufacturing the product with Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product.

The present claims provide a product including Erospicata oil, a non-menthol cooling agent and an effective amount of menthol. See, Specification, page 1, paragraph 4; paragraph 12, lines 1-4; page 2, paragraph 19. The unique combination of Erospicata oil and a non-menthol cooling agent provides a novel flavor which reduces the cost of peppermint-flavored products. See, Specification, page 1, paragraph 4, lines 6-12; paragraph 5, lines 1-6. Menthol may also be included in the product as an additional flavoring agent to kill germs. See, Specification, page 6, paragraph 68, lines 1-2 and 6-12. Furthermore, by including the Erospicata oil in an amount between 0.01% and 5% by weight of the product, the product provides a unique flavoring benefit. See, Specification, page 2, paragraph 22; page 5, paragraph 54, lines 1-3; Tables 1-2 and 6. In contrast, the cited references fail to disclose a product comprising Erospicata oil, an effective amount of menthol and a cooling agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product for at least the reasons set forth below.

2. Even if combinable, the cited references do not teach or suggest a product comprising Erospicata oil, an effective amount of menthol and a cooling agent

Appellants respectfully submit that the cited references fail to disclose or suggest a product comprising Erospicata oil, an effective amount of menthol and a cooling agent as required, in part, by all of the independent Claims 1, 11, 27 and 32-33 and Claims 4, 7-10, 14, 18-20 and 28-31 that depend therefrom. The Patent Office asserts that *Sturtz* discloses an effective amount of menthol merely because the Erospicata oil contains 1% menthol. See, Final Office Action, page 4, lines 19-21. However, contrary to the Patent Office's assertion, *Sturtz* does not disclose that its Erospicata oil contains 1% menthol but rather a maximum of 1% menthol. See, *Sturtz*, column 2, lines 14-15; column 3, lines 5-15; Table 6. Table 1 shows that the actual weight percent of menthol in the Erospicata oil is only 0.05%. See, *Sturtz*, Table 1. Furthermore, Appellants note that the weight percent of menthol is only 0.05% of the Erospicata

oil. See, *Sturtz*, Table 1. Therefore, if the weight percent of menthol is 0.05% of the Erospicata oil, and the Erospicata oil comprises only 0.01% to 5% by weight of the total product, the amount of menthol in the total product as a result of the Erospicata oil is only between 0.000005% and 0.0025%. Appellants respectfully submit that one of ordinary skill in the art would understand that such an amount is not an effective amount within the meaning of the present claims.

*Sturtz* is entirely directed to a low-menthol Erospicata plant. See, *Sturtz*, Title; Abstract, lines 1-4; Column 1, lines 19-26. Although *Sturtz* discloses that its Erospicata oil may contain a small amount of menthol, nowhere does *Sturtz* disclose that its Erospicata oil contains an effective amount of menthol, nor does the Patent Office cite support for such claimed element. See, *Sturtz*, column 2, lines 9-15. In fact, *Sturtz* expressly states that “menthol is substantially absent from the oil.” See, *Sturtz*, column 2, lines 29-32. Moreover, *Sturtz* teaches that “[t]he low menthol content of the essential oil is important because menthol is an alcohol that irritates nasal, oral and gastrointestinal epithelium.” As such, Appellants respectfully submit that one of ordinary skill in the art would understand that *Sturtz* is entirely directed to as low a menthol content as possible and would thus not include an effective amount of menthol. Therefore, *Sturtz* fails to disclose an effective amount of menthol.

Furthermore, *Kumamoto* fails to disclose an effective amount of menthol and a cooling agent within the meaning of the present claims. The Patent Office asserts that *Kumamoto* teaches using menthol but that other non-menthol cooling agents may be used. See, Non-Final Office Action, page 4, lines 19-22; page 5, lines 1-3. However, Appellants respectfully submit that *Kumamoto* fails to disclose using menthol and a non-menthol cooling agent as required, in part, by the present claims. The present Specification expressly states that “[c]ooling agents, for the purpose of the present invention are defined as non-menthol cooling agents.” See, Specification, page 1, paragraph 4, lines 10-12. Therefore, the effective amount of menthol in the present claims cannot be included in the non-menthol cooling agent.

*Kumamoto* is entirely directed to warming compositions including a cooling agent and a small amount of a compound represented by formula (I) and/or a warming agent. See, *Kumamoto*, page 1, paragraph 7, lines 1-9. The only disclosure of menthol in *Kumamoto* is the statement that “[s]pecific examples of the cooling agents which are preferably used in the invention include. . . menthol, isopulegol, . . . and spearmint oil.” See, *Kumamoto*, page 2,

paragraph 26. Therefore, *Kumamoto* merely discloses using menthol as a cooling agent. However, nowhere does *Kumamoto* disclose using menthol and a non-menthol cooling agent. Instead, *Kumamoto* either discloses menthol or a non-menthol cooling agent, but not both. If the Patent Office relies on *Kumamoto* for the disclosure of a non-menthol cooling agent, *Kumamoto* thus fails to disclose an effective amount of menthol. Conversely, if the Patent Office relies on *Kumamoto* for the disclosure of menthol, *Kumamoto* fails to disclose a non-menthol cooling agent. Therefore, Appellants respectfully submit that *Kumamoto* fails to disclose an effective amount of menthol and a cooling agent as required, in part, by the present claims

3. Even if combinable, the cited references do not teach or suggest a product comprising Erospicata oil, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product

Appellants respectfully submit that the cited references also fail to disclose or suggest a product comprising Erospicata oil, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product as required, in part, by all of the independent Claims 1, 11, 27 and 32-33 and Claims 4, 7-10, 14, 18-20 and 28-31 that depend therefrom. In response to Appellants' argument that the cited references fail to disclose the claimed range of Erospicata oil in the product, the Patent Office, citing the MPEP, merely asserts that changes in result effective variables are generally not patentable because experimentation to find an optimum range involves no more than routine skill in the art. See, Final Office Action, page 4, lines 21-22; page 5, lines 1-3. However, the portion of the MPEP relied upon by the Patent Office expressly states that “[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.” See, MPEP Section 2144.05.II (2009). Nowhere do *Sturtz* or *Kumamoto* disclose that Erospicata oil is incorporated into an oral product to achieve a novel flavor. Instead, *Sturtz* merely discloses that Erospicata oil has a characteristic peppermint taste and smell, rather than a novel flavor when combined with a cooling agent. See, *Sturtz*, column 2, lines 5-7. Moreover, *Kumamoto* fails to disclose Erospicata oil at all. As such, the cited references fail to recognize that the amount of Erospicata oil in an oral product affects the novel flavor achieved. Therefore,

Appellants respectfully submit that the claimed range of Erospicata oil is not a matter of routine experimentation and, thus, is patentable over the cited references.

4. One of ordinary skill in the art would have no reason to combine the cited references because *Sturtz* teaches away from *Kumamoto* and the present claims

Appellants submit that one of ordinary skill in the art would have no reason to combine the cited references because *Sturtz* teaches away from both *Kumamoto* and the present claims. *Kumamoto* is entirely directed to an oral composition including a combination of a cooling agent with a warming agent or a compound of formula (I). See, *Kumamoto*, page 1, paragraph 7, lines 1-9; ; paragraphs 8-10; paragraph 14, lines 1-5. *Kumamoto* specifically teaches that its cooling agent may include menthol. See, *Kumamoto*, page 2, paragraph 26, lines 1-3. Similarly, the present claims require an effective amount of menthol in an oral consumable product.

In contrast, *Sturtz* is entirely directed to providing as low a menthol content as possible while also providing peppermint-like organoleptic properties. See, *Sturtz*, column 2, lines 28-31. *Sturtz* specifically teaches that menthol is undesirable in ingestible products “because menthol is an alcohol that irritates nasal, oral and gastrointestinal epithelium.” See, *Sturtz*, column 2, lines 24-28. In fact, *Sturtz* states that menthol is “substantially absent from the oil” and that “[t]he low menthol content of the essential oil is important” to avoid nasal and gastrointestinal problems. See, *Sturtz*, column 2, lines 24-26 and 28-31. Thus, *Sturtz* teaches away from using any menthol in ingestible products as disclosed by *Kumamoto* and the present claims.

The Patent Office asserts that one of ordinary skill in the art would combine *Sturtz* and *Kumamoto* “to be able to use menthol as a cooling agent while still having a strong peppermint flavor without using a lot of peppermint oil, which adds additional menthol.” See, Final Office Action, page 3, lines 14-16. However, as discussed previously, *Sturtz* teaches away from the use of any menthol in ingestible products, regardless of whether the menthol is used as a cooling agent. *Sturtz* expressly states that menthol, without any limitation as to what the menthol is used for, “irritates nasal, oral and gastrointestinal epithelium.” See, *Sturtz*, column 2, lines 24-28. Nowhere does *Sturtz* disclose or suggest that menthol is desirable if it is used as a cooling agent. As such, *Sturtz* teaches away from the use of any menthol in oral consumable products.

In response to Appellants' argument, the Patent Office asserts that "*Sturtz* does not teach not using menthol at all [but rather] an alternative to avoid too much menthol being used." See, Final Office Action, page 3, lines 18-19. As support for its assertion, the Patent Office notes that although menthol is not abundant in the Erospicata oil of *Sturtz*, it is present. See, Final Office Action, page 3, lines 20-22. However, the Patent Office ignores the express teaching in *Sturtz* that "the absence of [menthol] helps avoid nasal and gastrointestinal irritation." See, *Sturtz*, column 2, lines 31-33. Although the Erospicata oil of *Sturtz* may contain a very small amount of menthol (only 0.05%, which *Sturtz* describes as being "substantially absent" from the oil), *Sturtz* expressly teaches away from using any additional menthol apart from that present in the Erospicata oil. See, *Sturtz*, column 2, lines 24-34; Table 1. Furthermore, for reasons discussed previously, the amount of menthol present in the Erospicata oil does not constitute an effective amount of menthol in accordance with the present claims. As such, additional menthol must be used along with the Erospicata oil to achieve an effective amount of menthol. However, by expressly disparaging the use of menthol in ingestible products, *Sturtz* teaches away from using menthol as a cooling agent in addition to its Erospicata oil or using an effective amount of menthol.

The Patent Office further asserts that one of skill in the art would be motivated to use the Erospicata oil of *Sturtz* instead of peppermint oil "to obtain the peppermint taste while avoiding a bitter taste and being able to add menthol in the desired amount to achieve its benefit without adding too much menthol." See, Final Office Action, page 4, lines 7-10. However, nowhere does *Sturtz* disclose how much menthol would be "too much" to use in an ingestible product, nor does the Patent Office cite support for such assertion. Instead, contrary to the Patent Office's assertion, *Sturtz* discloses that adding menthol generally to an oral product causes nasal and gastrointestinal irritation. See, *Sturtz*, column 2, lines 24-26. As such, *Sturtz* teaches away from adding any menthol, beyond what is present in its Erospicata oil, to an oral product.

The Patent Office also asserts that one of ordinary skill in the art would simply recognize when menthol is suitable and unsuitable for use and would reasonably choose one of the non-menthol cooling agents of *Kumamoto* when menthol is not suitable. See, Final Office Action, page 4, lines 14-19. However, even if such assertion is true, Appellants respectfully submit that *Sturtz* still teaches away from using menthol as disclosed by *Kumamoto* and the present claims. The Patent Office cannot pick and choose specific teachings of the references to meet the

claimed limitations but rather must consider the teachings of each reference as a whole. See, MPEP Section 2142 (2009). Regardless of which cooling agent one of ordinary skill in the art may choose, the fact remains that *Sturtz* as a whole expressly teaches away from using any menthol in addition to that contained in its Erospicata oil. See, *Sturtz*, column 2, lines 24-28. Because *Kumamoto* discloses that menthol may be used as a cooling agent, Appellants respectfully submit that *Sturtz* teaches away from *Kumamoto*. Furthermore, as discussed previously, *Sturtz* teaches away from an effective amount of menthol as required by the present claims. Because *Sturtz* is entirely directed to an oil with as low a menthol content as possible to avoid gastrointestinal and nasal irritation, *Sturtz* teaches away from adding menthol to an oral product as taught by *Kumamoto* and the present claims.

In sum, the Patent Office has failed to consider the cited references as a whole including those portions teaching against or away from each other and/or the claimed invention. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443, 448-49 (Fed. Cir. 1986). “A prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by [Appellants].” *Monarch Knitting Machinery Corp. v. Fukuhara Industrial Trading Co., Ltd.*, 139 F.3d 1009 (Fed. Cir. 1998). Specifically, the Patent Office has continued to ignore the express teaching in *Sturtz* that menthol is undesirable in oral products “because menthol is an alcohol that irritates nasal, oral and gastrointestinal epithelium.” See, *Sturtz*, column 2, lines 24-28. Because *Sturtz* teaches away from *Kumamoto* and the present claims, one of ordinary skill in the art would have no reason to combine the cited references to arrive at the present claims.

For at least the reasons discussed above, Appellants respectfully submit that Claims 1, 4, 7-11, 14, 18-20 and 27-33 are novel, nonobvious and distinguishable from the cited references and are in condition for allowance.

Accordingly, Appellants respectfully request that the rejection of Claims 1, 4, 7-11, 14, 18-20 and 27-33 under 35 U.S.C. §103(a) be withdrawn. .

### VIII. CONCLUSION

Appellants respectfully submit that the Patent Office has failed to establish a *prima facie* case of obviousness under 35 U.S.C. §103 with respect to the rejection of Claims 1, 4, 7-11, 14, 18-20 and 27-33. Accordingly, Appellants respectfully submit that the obviousness rejection is erroneous in law and in fact and should therefore be reversed by this Board.

The Director is authorized to charge \$540 for the Appeal Brief and any additional fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 112703-306 on the account statement.

Respectfully submitted,

K & L GATES LLP

BY

Robert M. Barrett  
Reg. No. 30,142  
Customer No. 29157

Dated: April 30, 2009

## **CLAIMS APPENDIX**

### **PENDING CLAIMS ON APPEAL OF U.S. PATENT APPLICATION SERIAL NO. 10/705,481**

1. A consumable oral product comprising Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total consumable oral product, and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.
4. The consumable oral product of Claim 1 wherein the heating agent is present in an amount of from about 0.01% to about 2.0% by weight of the total consumable oral product.
7. The consumable oral product of Claim 1 wherein the product is selected from the group consisting of chewing gum, dentifrice, confection, lozenge, mouthwash, mouth spray, and edible film.
8. The consumable oral product of Claim 1 wherein the Erospicata oil is present as a flavoring agent.
9. The consumable oral product of Claim 8 wherein the flavoring agent comprises 0.05 to 5% by weight of the total consumable oral product.
10. The consumable oral product of Claim 8 wherein Erospicata oil comprises 5 to 70% by weight of the total flavoring agent.

11. A chewing gum product comprising Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product, and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

14. The chewing gum product of Claim 11 wherein the cooling agent is present in an amount of from about 0.01% to about 2.0% by weight of the total chewing gum product.

18. The chewing gum product of Claim 11 wherein the Erospicata oil is present as a flavoring agent.

19. The chewing gum product of Claim 18 wherein the flavoring agent comprises 0.05 to 5% by weight of the total chewing gum product.

20. The chewing gum product of Claim 18 wherein Erospicata oil comprises 5 to 70% by weight of the total flavoring agent.

27. A method of enhancing a flavor in an oral consumable product comprising the steps of adding to a consumable oral product Erospicata oil, an effective amount of menthol, a heating agent and a cooling agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total oral consumable product, and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

28. The method of Claim 27 wherein the oral consumable product is selected from the group consisting of chewing gum, dentifrice, confection, lozenge, mouthwash, mouth spray, and edible film.

29. The method of Claim 27 wherein the Erospicata oil is present as a flavoring agent.

30. The method of Claim 29 wherein the flavoring agent comprises 0.05 to 5% by weight of the total oral consumable product.

31. The method of Claim 29 wherein Erospicata oil comprises 5 to 70% by weight of the total flavoring agent.

32. A method of producing a chewing gum product comprising the steps of adding to a composition that includes a gum base, Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total chewing gum product, and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

33. A method of reducing the amount of peppermint flavor required to achieve an organoleptic effect in a product comprising the steps of manufacturing the product with Erospicata oil, an effective amount of menthol, a cooling agent and a heating agent, wherein the Erospicata oil comprises about 0.01% to about 5% by weight of the total product, and wherein the heating agent is chosen from the group consisting of capsicum oleoresin, capsaicin, piperine, gingerol, shoagol, cinnamic aldehyde, ginger oleoresin, cinnamon oleoresin, and cassia oleoresin, black pepper oleoresin, pepper oleoresin and combinations thereof.

## **EVIDENCE APPENDIX**

**EXHIBIT A:** Non-Final Office Action dated February 5, 2008

**EXHIBIT B:** Final Office Action dated December 1, 2008

**EXHIBIT C:** U.S. Patent Publication No. 2002/0119231 A1 to Kumamoto et al. (“*Kumamoto*”), cited by the Patent Office in the Non-Final Office Action dated February 5, 2008 and the Final Office Action dated December 1, 2008

**EXHIBIT D:** U.S. Patent No. Plant 8,645 to Sturtz (“*Sturtz*”), cited by the Patent Office in the Final Office Action dated December 1, 2008

**RELATED PROCEEDINGS APPENDIX**

None.

# **EXHIBIT A**



# UNITED STATES PATENT AND TRADEMARK OFFICE

19  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,481	11/10/2003	Sonya S. Johnson	112703-306	5154
29156	7590	02/05/2008	EXAMINER	
BELL, BOYD & LLOYD LLP			ROBERTS, LEZAH	
P.O. Box 1135			ART UNIT	PAPER NUMBER
CHICAGO, IL 60690			1612	
		MAIL DATE	DELIVERY MODE	
		02/05/2008	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/705,481	JOHNSON ET AL.
	Examiner Lezah W. Roberts	Art Unit 1612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 31 October 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1,4,7-11,14,18-21 and 24-33 is/are pending in the application.
- 4a) Of the above claim(s) 21 and 24-26 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,4,7-11,14,18-20 and 27-33 is/are rejected.
- 7) Claim(s) 9, 19 and 30 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All
  - b) Some \*
  - c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date _____	6) <input type="checkbox"/> Other: _____

## DETAILED ACTION

This Office action is in response to the Request for Continued Examination filed October 31, 2007. All previous rejections have been withdrawn unless stated below.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### *Claims*

#### Claim Rejections - 35 USC § 112 – New Matter (New Rejection)

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 7, 8, 11, 14, 18, 19, 27-29, 32 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims recite the limitation "approximately", which does not appear to be originally disclosed by the instant specification and therefore constitutes "New Matter".

#### Claim Rejections - 35 USC § 112 – Indefiniteness (New Rejections)

Claims 1, 4, 7-9, 11, 14, 18, 19, 27-30, 32 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- 1) Claims 1, 4, 7, 8, 11, 14, 18, 27-29, 32 and 33 recite the limitation "approximately about". "Approximately" is synonymous with "about" and therefore the recitation of "approximately" is redundant and makes the term "about", which in this case, is otherwise definite indefinite.
- 2) Claims 9, 19 and 30 recite the limitation "15%" in the second line. There is insufficient antecedent basis for this limitation in the claim.

**Claim Rejections - 35 USC § 103 – Obviousness (Previous Rejection)**

Claims 1, 4, 6-9, 11, 14-16, 18-19, 27-30 and 32-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto et al. (US 2002/0119231) in view of Sturtz (US Plant 8,645). The rejection is maintained in regards 1, 4, 7-9, 11, 14, 18-19, 27-30 and 32-33 and further applied to claims 10, 20 and 31.

**Applicant's Arguments**

Applicant argues Kumamoto is entirely directed to warming compositions. The references must be considered as a whole and those portions teachings against or away from the claimed invention must be considered. Kumamoto repeatedly emphasizes that the invention is directed toward providing warming compositions that

exhibit long-lasting warming effects. In contrast, however, Sturtz is directed primarily toward a new and distinct variety of a mint plant, now known Erospicata. Erospicata can be used as a replacement to various cooling agents, including peppermint, to create a cooling composition without epithelial irritation caused by large amounts of menthol. The warming compositions of Kumamoto teach away from a combination with the cooling compositions of Sturtz, and the skilled artisan would have no reason to combine the cited reference to arrive at the present claims. Applicant submits that unless those portions of the art that teach away from the combination that is proposed are considered, Applicant respectfully submit that almost every invention would be obvious. The Office has improperly applied hindsight reasoning by attempting to selectively piece together teachings of each of the reference in an attempt to recreate what the claimed invention discloses. The combination of reference does not recite all the limitations in the instant claims. Kumamoto also teaches cooling agents that include menthol, which contradicts the teachings of the instant claims. Applicant further asserts not only do the claims require cooling agents that are "non-menthol" cooling agents, but Erospicata is used as a replacement for the menthol commonly used in products like that of Kumamoto.

Examiner's Response

Although Kumamoto discloses warming compositions, it is specifically disclosed that flavors and cooling agents are used in combination with warming compositions. These include peppermint as a flavoring. A cooling agent is specifically disclosed as component (A) and the compositions comprise (A) a cooling agent, (B) a compound

Art Unit: 1612

formula I and (C) a warming agent (paragraph 0011). The cooling agents not only include menthol but also include peppermint as well as isoplegol, menthone and spearmint oil. The preferred cooling agents do not include menthol. Applicant implies that menthol is preferred and must be included in the composition which is not the case. Therefore Kumamoto does not teach away from using cooling agents in the compositions. In regards to Sturtz, it does not disclose that erospicata may only be used in cooling agents. It does disclose that erospicata may replace peppermint oil to reduce irritates nasal, oral and gastrointestinal epithelium. This is motivation why one would replace peppermint or even menthol with erospicata when the taste of peppermint is preferred. The flavor in the chewing gum compositions comprise about 0.8% of the compositions encompassing the instant claims. Applicant appears to be arguing that the Examiner has used improper hindsight reasoning in construing her rejection. The Examiner does not agree, however, since the knowledge used (such as erospicata oil has the taste characteristics of peppermint without the irritation caused by menthol in peppermint) comes from the prior art, not from applicant's specification. Reconstruction of this type is in fact permitted; see *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). One of ordinary skill in the art would have been motivated have substituted peppermint oil with erospicata when a stronger peppermint taste or no menthol was desired.

In regards to claims 10, 20 and 31, normally, changes in result effective variables are not patentable where the difference involved is one of degree, not of kind; experimentation to find workable conditions generally involves the application of no

Art Unit: 1612

more than routine skill in the art. In re Aller 105 USPQ 233, 235 (CCPA 1955). It would have been obvious to adjust the amount of erospicata oil in the flavor composition motivated by the desire to achieve optimum flavor in the oral composition as supported cited precedent.

Claims 1, 4, 7-11, 14, 18-20 and 27-33 are rejected.

Claims 9, 19 and 30 are objected.

Claims 21 and 24-26 are withdrawn.

No claims allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lezah W. Roberts whose telephone number is 571-272-1071. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frederick F. Krass can be reached on 571-272-0580. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

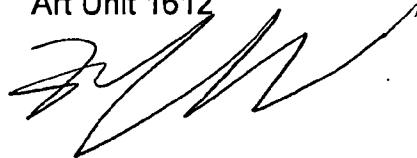
Art Unit: 1612

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lezah Roberts  
Patent Examiner  
Art Unit 1612



Frederick Krass  
Supervisory Patent Examiner  
Art Unit 1612



# **EXHIBIT B**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,481	11/10/2003	Sonya S. Johnson	112703-306	5154
29156	7590	12/01/2008		
BELL, BOYD & LLOYD LLP			EXAMINER	
P.O. Box 1135			ROBERTS, LEZAH	
CHICAGO, IL 60690			ART UNIT	PAPER NUMBER
			1612	
			MAIL DATE	DELIVERY MODE
			12/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/705,481	JOHNSON ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	LEZAH W. ROBERTS	1612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 13 August 2008.
- 2a) This action is **FINAL**.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,4,7-11,14,18-21 and 24-33 is/are pending in the application.
  - 4a) Of the above claim(s) 21 and 24-26 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,4,7-11,14,18-20 and 27-33 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

This Office action is in response to the Amendment filed August 13, 2008. All previous rejections have been withdrawn unless stated below.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claims***

#### **Claim Rejections - 35 USC § 103 – Obviousness (Previous Rejection)**

Claims 1, 4, 7-11, 14, 18-20 and 27-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kumamoto et al. (US 2002/0119231) in view of Sturtz (US Plant 8,645). The rejection is maintained.

#### **Applicant's Arguments**

Applicant argues there is no reason why the skilled artisan would combine Kumamoto et al. and Sturtz. Sturtz is entirely directed toward providing compositions that do not cause epithelial irritation by including large amounts of menthol. As such, Sturtz teaches away from the combination with Kumamoto and from the present claims. Kumamoto teaches menthol and does not disparage the use of menthol because of any possible irritation that it may cause. The fact that Kumamoto even teaches that menthol can be used as a cooling agent would lead the skilled artisan away from a combination with Sturtz. Because Sturtz teaches a low-menthol mint plant for producing an oil

wherein "menthol is substantially absent from the oil" of the plant, Sturtz also teaches away from the present claims. The Patent Office has improperly applied hindsight reasoning by attempting to selectively piece together teachings of each of the references in an attempt to recreate what the claimed invention discloses. The fact that the prior art may be modified in the manner suggested the Patent Office does not make the modification obvious. Applicant further argues even if the references are combinable they do not disclose or suggest all of the elements of the presently amended independent claims. There is also no disclosure of how much erosipicata oil is used in a consumable product. Kumamoto also does not disclose or suggest a composition comprising menthol and a non-menthol cooling agent. This argument is not persuasive.

Examiner's Response

One of the reasons one of skill in the art would combine the two references is to be able to use menthol as a cooling agent while still having a strong peppermint flavor without using a lot of peppermint oil, which adds additional menthol. When using the menthol and erosipicata oil together as separate components, one may optimize the amount of each component to achieve the desired effect. Sturtz does not teach not using menthol at all, it teaches an alternative to avoid too much menthol being used. Further, although menthol is not in an abundant amount in erosipicata oil, it is present therefore when using erosipicata oil in the compositions of Kumamoto, menthol will also be present. Therefore Sturtz does not teach away from using menthol it teaches

alternatives so that a large amount of menthol does not have to be used and a strong peppermint taste may be obtained. One of skill in the art would recognize, when menthol is required, for instance as a medicinal agent, and peppermint is preferred as a flavorant, that erospicata oil would be beneficial to give a strong peppermint flavor without using too much menthol and still achieving the medicinal benefit. Peppermint oil also has other components that make it undesirable such as piperitone, which provides a bitter taste (Sturtz, col. 3, lines 1-4). One of skill in the art would be motivated to use erospicata oil in place of peppermint to obtain the peppermint taste while avoiding a bitter taste and being able to add menthol in the desired amount to achieve its benefit without adding too much menthol, which leads to irritation.

Therefore, Sturtz provides several reasons why one would use erospicata oil, the first, to avoid too much menthol when this is desired and second, to avoid the bitter taste due to piperitone when this is desired. Kumamoto does teach using menthol, but it does not teach it as the preferred cooling agent. One of skill in the art would be aware of the properties of menthol, as disclosed by Sturtz, and would recognize when menthol is and is not suitable for use. In regards to hindsight reasoning, the primary reference lists menthol as a possible cooling agent but also discloses other cooling agents which are preferred. One of skill in the art would consider this and would reasonably choose one of the preferred cooling agents when menthol is not suitable. The menthol would be introduced, as required by the instant claims, when erospicata is added because erospicata comprises 1% menthol, encompassing the instant claims. In regards to the amounts, normally, changes in result effective variables are not patentable where the

difference involved is one of degree, not of kind; experimentation to find workable conditions generally involves the application of no more than routine skill in the art. See MPEP 2144.05 II. It would have been obvious to adjust the amount of erosipicata oil in the flavor composition motivated by the desire to achieve optimum flavor in the oral composition. Therefore the combined references taken as a whole, teach the limitation of the instant claims.

Claims 1, 4, 7-11, 14, 18-20 and 27-33 are rejected.

Claims 21 and 24-26 are withdrawn.

No claims allowed.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEZAH W. ROBERTS whose telephone number is (571)272-1071. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frederick F. Krass can be reached on 571-272-0580. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lezah W Roberts/  
Examiner, Art Unit 1612

/Frederick Krass/  
Supervisory Patent Examiner, Art Unit 1612

# **EXHIBIT C**



US 20020119231A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0119231 A1**

Kumamoto et al.

(43) **Pub. Date:** **Aug. 29, 2002**

(54) **WARMING COMPOSITION FOR FOOD AND DRINK OR FOR ORAL CARE PREPARATION**

(30) **Foreign Application Priority Data**

Dec. 12, 2000 (JP) ..... P. 2000-376814

(75) Inventors: **Hiroyasu Kumamoto, Tokyo (JP); Tatsuo Kitamura, Kanagawa (JP)**

**Publication Classification**

(51) **Int. Cl.<sup>7</sup>** ..... **A23L 1/22; A61K 7/16**

(52) **U.S. Cl.** ..... **426/534; 426/536; 426/650; 424/49**

Correspondence Address:  
**SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC**

**(57) ABSTRACT**

This invention relates to a warming composition for food and drink or for oral care preparations which produces an excellent and long-lasting warming effect and causes no or little irritation to mucous membranes, a flavor composition for food and drink or for oral care preparations which comprises the warming composition, and beverages or oral care preparations which contain the warming composition or the flavor composition.

(73) **Assignee: TAKASAGO INTERNATIONAL CORPORATION**

(21) **Appl. No.:** **10/006,137**

(22) **Filed:** **Dec. 10, 2001**

## WARMING COMPOSITION FOR FOOD AND DRINK OR FOR ORAL CARE PREPARATION

### FIELD OF THE INVENTION

[0001] This invention relates to a warming composition for food and drink or for oral care preparations which produces an excellent and long-lasting warming effect and causes no or little irritation to mucous membranes, a flavor composition for food and drink or for oral care preparations which comprises the warming composition, and beverages or oral care preparations which contain the warming composition or the flavor composition.

### BACKGROUND OF THE INVENTION

[0002] Substances which are known to provide a sensation of warmth on application and called "warming agents" include polyhydric alcohols, capsicum (red pepper) powder, a capsicum tincture, capsicum extract, capsaicin, homocapsaicin, homodihydrocapsaicin, nonanoyl vanillyl amide, nonanoic acid vanillyl ether, vanillyl alcohol alkyl ether derivatives (JP-A-57-9729), such as vanillyl ethyl ether, vanillyl butyl ether, vanillyl pentyl ether, and vanillyl hexyl ether, isovanillyl alcohol alkyl ethers, ethylvanillyl alcohol alkyl ethers, veratryl alcohol derivatives, substituted benzyl alcohol derivatives, substituted benzyl alcohol alkyl ethers, vanillin propylene glycol acetal, ethylvanillin propylene glycol acetal, ginger extract, ginger oil, gingeol, and gingerol.

[0003] The warming composition is added either directly as such or in the form of a flavor composition to beverages and oral care preparations to produce a warming effect. However, the known warming agents often cause strong irritation on mucous membranes or exhibit insufficient warming effects, and those having high warming effects are of short duration or, when used in a reduced amount, have insufficient warming effects or an insufficient duration of effect.

[0004] An object of the present invention is to provide a warming composition for food and drink and for oral care preparations which is freed of these problems, i.e., causes no or little mucous membrane irritation and exhibits an excellent and long-lasting warming effect in a small amount.

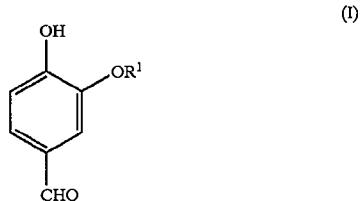
[0005] Another object of the present invention is to provide a flavor composition which causes no or little mucous membrane irritation and imparts a long-lasting warming effect when added in a small amount.

[0006] Still another object of the invention is to provide foods, beverages, and oral care preparations which contain the warming composition or the flavor composition and exhibit excellent and long-acting warming effects.

[0007] As a result of extensive investigations, the inventors have found that a combination of a compound or a composition that has been known as a cooling agent (hereinafter inclusively referred to as a cooling agent) and a small amount of a compound represented by formula (I)(B) and/or a compound or a composition that has been known as a warming agent (hereinafter inclusively referred to as a warming agent) produces such a warming effect as is never expected from each of the components used alone and as lasts as long as 3 hours or even more, and, when added to a product, exhibits an appreciable warming effect in such a

low concentration at which each component would not stimulate individually, making it possible to produce a warming effect with no skin irritation that has not heretofore been attained.

[0008] The present invention provides a warming composition for food and drink and for oral care preparations comprising (A) a cooling agent and (B) a compound represented by formula (I):



[0009] wherein R<sup>1</sup> represents a hydrogen atom, a methyl group or an ethyl group.

[0010] The present invention also provides a warming composition for food and drink and for oral care preparations comprising (A) a cooling agent and (C) a warming agent.

[0011] The present invention also provides a warming composition for food and drink and for oral care preparations comprising (A) a cooling agent, (B) a compound represented by formula (I), and (C) a warming agent.

[0012] The present invention also provides a flavor composition for beverage and food or an oral care preparation comprising any of the above-described warming compositions.

[0013] The present invention also provides a food, a beverage or an oral care preparation comprising any of the above-described warming compositions or the above-described flavor composition.

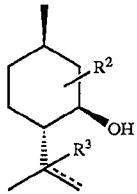
[0014] In the present invention, a combination of a cooling agent and at least one of a warming agent and a specific compound produces an appreciable warming effect at such a low concentration at which each component alone is ineffective. The warming effect of the warming composition of the invention lasts for a long period of time that has not been thought. The warming composition of the invention is unlike conventional ones in that when it is applied to one's sole, the warming effect is also produced in her or his back, etc.

[0015] The warming composition of the present invention comprises (A) a cooling agent and at least one of (B) a compound represented by formula (I) and (C) a warming agent.

[0016] The cooling agent as component (A) can be any compound or composition known as a cooling agent. Typical examples of the cooling agents which can be used in the invention include:

[0017] (1) a compound represented by formula (II):

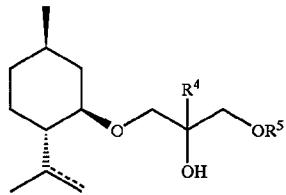
(II)



[0018] wherein R<sup>2</sup> and R<sup>3</sup> each represent a hydrogen atom or a hydroxyl group (---- represents a single bond or a double bond, the same definition applies hereinafter),

[0019] (2) a compound represented by formula (III):

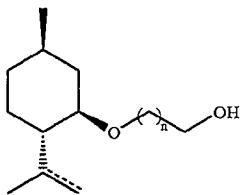
(III)



[0020] wherein R<sup>4</sup> represents a hydrogen atom or a methyl group; R<sup>5</sup> represents a hydrogen atom, a lower alkyl group or a 2-alkoxyethyl group,

[0021] (3) a compound represented by formula (IV):

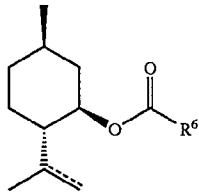
(IV)



[0022] wherein n represents an integer of 1 to 10,

[0023] (4) a compound represented by formula (V):

(V)



[0024] wherein R<sup>6</sup> represents a hydrogen atom, a straight-chain or branched alkyl or alkenyl group, or a straight-chain or branched hydroxalkyl group,

[0025] (5) 1-menthylacetic acid N-ethylamide, and (6) N,2,3-trimethyl-2-(1-methylethyl)-butanamide.

[0026] Specific examples of the cooling agents which are preferably used in the invention include, but are not limited to, menthol, isopulegol, 3-(1-menthoxy) propane-1,2-diol, 3-(1-menthoxy)-2-methylpropane-1,2-diol, p-menthane-2,3-diol, p-menthane-3,8-diol, 6-isopropyl-9-methyl-1,4-dioxoaspiro[4,5]decane-2-methanol, menthyl succinate and its alkaline earth metal salts, trimethylcyclohexanol, N-ethyl-2-isopropyl-5-methylcyclohexanecarboxamide, Japanese mint (*Mentha arvensis*) oil, peppermint oil, menthone, menthone glycerol ketal, menthyl lactate, 3-(1-menthoxy) ethan-1-ol, 3-(1-menthoxy)propan-1-ol, 3-(1-menthoxy)butan-1-ol, 1-menthylacetic acid N-ethylamide, 1-menthyl-4-hydroxypentanoate, 1-menthyl-3-hydroxybutyrate, N,2,3-trimethyl-2-(1-methylethyl)-butanamide, and spearmint oil.

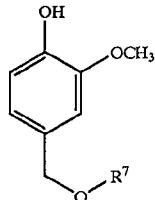
[0027] Of these cooling agents preferred are 3-(1-menthoxy)propane-1,2-diol, 3-(1-menthoxy)-2-methylpropane-1,2-diol, p-menthane-3,8-diol, 3-(1-menthoxy)ethan-1-ol, 3-(1-menthoxy)propan-1-ol, and 3-(1-menthoxy)butan-1-ol. Still preferred are 3-(1-menthoxy)propane-1,2-diol and 3-(1-menthoxy)-2-methylpropane-1,2-diol.

[0028] Of the compounds represented by formula (I) as component (B) the compound in which R<sup>1</sup> is a methyl group, i.e., vanillin is preferred.

[0029] The warming agent as component (C) includes, but is not limited to,

[0030] (i) vanillyl alcohol, vanillyl alkyl or alkenyl ethers represented by formula (VI):

(VI)



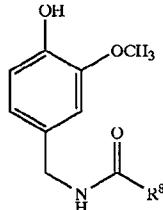
[0031] wherein R<sup>7</sup> represents a hydrogen atom or a straight chain or branched alkyl or alkenyl group having 1 to 10 carbon atoms, preferably 1 to 6 carbon atoms, such as vanillyl ethyl ether, vanillyl propyl ether, vanillyl butyl ether, vanillyl pentyl ether, and vanillyl hexyl ether;

[0032] (ii) vanillin propylene glycol acetal;

[0033] (iii) ethylvanillin propylene glycol acetal;

[0034] (iv) compounds represented by formula (VII):

(VII)



[0035] wherein R<sup>8</sup> represents a straight-chain or branched alkyl or alkenyl group,

[0036] (v) gingeron, 4-(1-menthoxymethyl)-2-(3',4'-dihydroxyphenyl)-1,3-dioxolane, 4-(1-menthoxymethyl)-2-(2'-hydroxy-3'-methoxyphenyl)-1,3-dioxolan, capsicum tincture, and ginger extract. Any other substances that have been used as a warming agent, including those described in the background of the present invention, can be used.

[0037] Of the above recited warming agents preferred are vanillyl ethyl ether, vanillyl propyl ether, vanillyl butyl ether, vanillyl pentyl ether, vanillyl hexyl ether, gingeron, capsicum tincture, and ginger extract. Still preferred are vanillyl butyl ether, vanillyl pentyl ether, vanillyl hexyl ether, and capsicum tincture. Vanillyl butyl ether is the most preferred.

[0038] Component (B) is usually used in an amount of 0.000001 to 100 parts, preferably 0.0001 to 10 parts, still preferably 0.001 to 1 part, by weight per part by weight of component (A), and component (C) is usually used in an amount of 0.5 to 100 parts, preferably 0.5 to 10 parts, still preferably 0.5 to 1 part, by weight per part by weight of component (A). Where the warming composition comprises both components (B) and (C), components (B) and (C) are used in an a total amount of 0.000001 to 100 parts, preferably 0.0001 to 10 parts, by weight per part by weight of component (A). The weight ratio of component (C) to component (B) is preferably 0.01 to 100.

[0039] A preferred combination of components (A), (B), and (C) includes a combination of (A) 3-(1-menthoxymethyl)propane-1,2-diol or 3-(1-menthoxymethyl)propane-1,2-diol and (B) vanillin and/or (C) vanillyl butyl ether. In this case, the combination usually comprises 0.0001 to 10 parts by weight, preferably 0.01 to 10 parts by weight, of component (B) and 0.5 to 5 parts by weight of component (C) each per part by weight of component (A).

[0040] The warming composition for food and drink or for oral care preparations, which comprises component (A) and components (B) and/or (C), may be diluted with a diluent safe to a human body, such as ethanol or pure water at an appropriate dilution decided according to the intended use, for example, about 1:2 to 1:10000.

[0041] The warming composition can be incorporated into a flavor composition for food and drink or oral care preparations. The flavor composition which can be used is not particularly limited, and any flavorings known in the art for use in foods, beverages or oral care products can be used. Examples of suitable flavorings include citrus flavors, such as an orange flavor, a lemon flavor, a lime flavor, a grapefruit flavor, a yuzu (Chinese lemon) flavor, and a sudachi flavor; fruit flavors, such as an apple flavor, a grape flavor, a strawberry flavor, a pineapple flavor, a banana flavor, a peach flavor, a melon flavor, an apricot flavor, an ume (Japanese apricot) flavor, a cherry flavor, a raspberry flavor, a blueberry flavor, and a tropical fruit flavor; milk flavors, such as a milk flavor, a butter flavor, a cheese flavor, a cream flavor, and a yogurt flavor; a vanilla flavor; tea or coffee flavors, such as a green tea flavor, a oolong tea flavor, a tea flavor, a cocoa flavor, a chocolate flavor, and a coffee flavor; mint flavors, such as a peppermint flavor, a spearmint flavor, and a Japanese mint flavor; spicy flavors, such as an asa-

fetida flavor, an ajowan flavor, an anise flavor, an angelica flavor, a fennel flavor, an allspice flavor, a cinnamon flavor, a camomile flavor, a mustard flavor, a cardamon flavor, a caraway flavor, a cumin flavor, a clove flavor, a pepper flavor, a coriander flavor, a sassafras flavor, a savory flavor, a Zanthoxyli Fructus flavor, a perilla flavor, a juniper berry flavor, a ginger flavor, a star anise flavor, a horseradish flavor, a thyme flavor, a tarragon flavor, a dill flavor, a capsicum flavor, a nutmeg flavor, a basil flavor, a marjoram flavor, a rosemary flavor, a bayleaf flavor, and a wasabi (Japanese horseradish) flavor; meat flavors, such as a beef flavor, a pork flavor, and a chicken flavor; marine flavors, such as a fish flavor, a shell flavor, a crustacean flavor, a dried and smoked fishes flavor, and a seaweed flavor; alcoholic flavors, such as a wine flavor, a whisky flavor, a brandy flavor, a rum flavor, a gin flavor, and a liqueur flavor; floral flavors; and vegetable flavors, such as an onion flavor, a garlic flavor, a cabbage flavor, a carrot flavor, a celery flavor, mushroom flavor, and a tomato flavor. For the details of compositions of these flavors, refer to Japanese Patent Office Gazette 12(2000)-1[7270], Known and Customary Techniques (Perfumes), II. Food Flavors. The warming composition of the invention can be used as a blending component or an additive component in flavor blending or as an additive after blending.

[0042] The warming composition or the flavor composition of the invention for food and drink and for oral care preparations can be used as an additive component to various products. The content of the warming composition in a final product is subject to wide variation according to the kind of the product, the amount of the product to be applied, the mode of use or application of the product, and the like. In general, the content of each of components (A), (B), and (C) in a final product can range from 0.000001 to 10%, preferably 0.0001 to 1%, still preferably 0.001 to 0.5%, by weight based on the final product. Component (A) and components (B) and/or (C) may be added to a product either separately with or without an appropriate solvent or in the form of a composition previously prepared from the components (i.e., the warming composition or the fragrance composition). They may be added as compounding components in the course of producing the product.

[0043] The warming composition for food and drink or for oral care preparations of the present invention can be used in flavor preparations, food and drink, or oral care preparations as a component for providing sensation of warmth or a component for prolonging sensation of warmth. The products to which the warming composition of the invention is applicable include, but are not limited to, food and drink, such as candies, drops, chewing gums, tablets, chocolates, cakes, cookies, snack food, bread, tea, coffee, juice, fruit drinks, fruit wine, dairy drinks, carbonated beverages, alcoholic beverages, seasonings, salad dressings, and dips; and oral care preparations, such as mouthwash, toothpaste, nebulizers, drinks, medicinal drops, gargles, and chewables.

[0044] In addition to the warming composition of the invention, these products can contain other additives according to use. For example, additives permitted by Food Sanitation Law can be added to food and drink according to necessity. Useful additives include saccharides, sweeteners, inorganic salts, emulsifiers, acidifiers, flavorings, colors, antioxidants, raising agents, thickeners, vegetable oils, milk, and other dairy products. In some detail, bakery products

can comprise wheat flour (base), butter, a raising agent, e.g., baking powder, an emulsifier, e.g., a sucrose fatty acid ester, saccharides, e.g., sugar, inorganic salts, and flavorings. Chocolate can comprise cacao mass (base) cacao butter, saccharides, e.g., sugar, milk, and an emulsifier. Emulsified dressings can comprise salad oil, water, vinegar, sugar, thickening polysaccharides, and sweeteners. Chewing gum can comprise a gum base, saccharides, such as sugar, glucose and starch syrup, and flavors. Candy can comprise saccharides, acidifiers, e.g., citric acid, sweeteners, flavorings, and colors. Orange fruit drinks can comprise orange juice, sweeteners, e.g., isomerized sugars, acidifiers, e.g., citric acid, and antioxidants, e.g., vitamin C. Fruit milk drinks can comprise fruit juice, dairy products such as milk and powdered skim milk, saccharides, e.g., sugar, stabilizers, e.g., carboxymethyl cellulose, acidifiers, e.g., citric acid, and flavorings, e.g., a pineapple flavor.

[0045] Additives which can be used in the oral care preparations include inorganic salts, inorganic oxides, organic salts, thickeners, wetting agents, emulsifiers, surface active agents, humectants, alcohols, color additives, flavorings, and, if desired, medical ingredients such as crude drugs, hemostatics, circulation stimulants, antiinflammatory agents, astringents, antibacterial and/or antifungal agents,

[0047] Abbreviations used hereunder have the following meanings.

[0048] CA-10: 3-(1-Methoxy)propane-1,2-diol

[0049] TPG-1: 3-(1-Methoxy)-2-methylpropane-1,2-diol

[0050] TK-5: 3-(1-Methoxy)ethan-1-ol

[0051] VBE: Vanillyl butyl ether

[0052] Particulars of commercially available products used hereunder are as follows. NIKKOL HCO-60: Polyoxyethylene hydrogenated castor oil (60E.O.), available from Nikko Chemicals Co., Ltd.

#### EXAMPLES 1 TO 4 AND COMPARATIVE EXAMPLES 1 TO 4

[0053] Warming Effect in Hard Candy

[0054] A panel consisting of three healthy males and four healthy females ate a piece of hard candy weighing 3 g having the formulation shown in Table 1 below and evaluated the warming effect and the irritation. The results of evaluation are shown in Table 1.

TABLE 1

Formulation (%)	Example 1	Example 2	Example 3	Example 4	Compara. Example 1	Compara. Example 2	Compara. Example 3	Compara. Example 4
Vanillin	0.005	0.005	—	0.005	—	—	0.005	—
VBE	—	—	0.005	0.005	—	—	—	0.005
CA-10	0.005	—	0.005	0.005	0.005	—	—	—
TPG-1	—	0.005	—	—	—	0.005	—	—
Granulated sugar	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
Starch syrup	46.6	46.6	46.6	46.6	46.6	46.6	46.6	45.6
Citric acid	1	1	1	1	1	1	1	1
Flavor	0.09	0.09	0.09	0.085	0.095	0.095	0.095	0.095
Effect								
Sensation during eating	almost nothing felt	almost nothing felt	comfortable tingling	comfortable tingling	nothing felt	nothing felt	nothing felt	comfortable tingling
Sensation after 30 mins.	warmth in the throat	nice warmth in the throat	warmth in the throat	nice warmth in the throat	nothing felt	nothing felt	nothing felt	nothing felt
Sensation after 1 hr.	warmth in the throat	nice warmth in the throat	warmth in the throat	warmth in the throat	nothing felt	nothing felt	nothing felt	nothing felt
Irritation	comfortable irritation	no irritation	weak irritation	weak irritation	no irritation	no irritation	no irritation	weak irritation

and bactericides. For example, toothpaste can comprise abrasives, such calcium phosphate, as calcium carbonate, aluminum hydroxide, silica, and calcium pyrophosphate; wetting agents, such as glycerin, sorbitol, and propylene glycol; tackifiers, such as carboxymethyl cellulose, carrageenan, and hydroxyethyl cellulose; surface active agents, such as sodium laurylsulfate, N-acylglutamines, and sucrose fatty acid esters; sweeteners, such as saccharin sodium, stevioside, and xylitol; and medicinal components, such as vitamin E, azulene, aluminum chlorohydroxy allanthoinate, dextranase, hinokitiol, lysozyme chloride, and chlorhexidine.

[0046] The present invention will now be illustrated in greater detail with reference to Examples in view of Comparative Examples, but it should be understood that the invention is not limited thereto. Unless otherwise noted, all the percents are by weight.

[0055] The candies of Comparative Examples 1 to 3 had no warming effect at all. The candy of Comparative Example 4 gave a tingling, which was attributed to VBE and comfortable to the mouth, which subsided gradually. The candies of Examples 1 to 4 produced the warming effect deep in the throat. Containing VBE, the candies of Examples 3 and 4 began to provide a tingling sensation attributed to VBE in the mouth during eating, which connected to long-lasting warmth felt deep in the throat.

#### EXAMPLES 5 TO 7 AND COMPARATIVE EXAMPLES 5 TO 8

[0056] Warming Effect in Chewing Gum

[0057] A panel consisting of three healthy males and four healthy females chewed gum weighing 3 g having the formulation shown in Table 2 below for 5 minutes and

evaluated the warming effect and the irritation. The results of evaluation are shown in Table 2.

[0061] The mouthwashes of Comparative Examples 9 and 10 produced no warming effect at all. The mouthwash of

TABLE 2

Formulation (%)	Example 5	Example 6	Example 7	Compara. Example 5	Compara. Example 6	Compara. Example 7	Compara. Example 8
Vanillin	0.005	0.005	—	—	—	0.005	—
VBE	—	—	0.005	—	—	—	0.005
CA-10	0.005	—	0.005	0.005	—	—	—
TPG-1	—	0.005	—	—	0.005	—	—
Gum base	21	21	21	21	21	21	21
Powdered sugar	66	66	66	66	66	66	66
Starch syrup	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Citric acid	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Flavor	0.79	0.79	0.79	0.795	0.795	0.795	0.795
Effect							
Sensation during chewing	almost nothing felt	almost nothing felt	comfortable tingling	nothing felt	nothing felt	nothing felt	comfortable tingling
Sensation after 30 mins.	warmth in the throat	nice warmth in the throat	warmth in the throat	nothing felt	nothing felt	nothing felt	nothing felt
Sensation after 1 hr.	warmth in the throat	nice warmth in the throat	warmth in the throat	nothing felt	nothing felt	nothing felt	nothing felt
Irritation	comfortable irritation	no irritation	weak irritation	no irritation	no irritation	no irritation	weak irritation

[0058] The chewing gums of Comparative Examples 5 to 7 had no warming effect at all. The gum of Comparative Example 8 gave the mouth a comfortable tingling owing to VBE, which disappeared gradually. The gums of Examples 5 to 7 produced the warming effect deep in the throat. Containing VBE, the gum of Example 7 began to give a comfortable tingling attributed to VBE during chewing, which connected to a long-lasting sensation of warmth deep in the throat.

#### EXAMPLES 8 AND 9 AND COMPARATIVE EXAMPLES 9 TO 11

##### [0059] Warming Effect in Mouthwash

[0060] A panel consisting of three healthy males and four healthy females held 10 ml of mouthwash having the formulation shown in Table 3 below in their mouth for 10 seconds and then spat out to evaluate the warming effect and the irritation. The results of evaluation are shown in Table 3.

Comparative Example 11 gave the mouth a comfortable tingling owing to VBE, which disappeared gradually. It was confirmed that the mouthwashes of Examples 8 and 9 give the mouth a comfortable tingling attributed to VBE, which connects to a long-lasting sensation of warmth deep in the throat.

[0062] The warming composition of the invention which comprises a cooling agent and a warming agent is incorporated into products to make the products exert an appreciable warming effect in such a low concentration at which each component would be ineffective when used individually. The warming composition makes it possible to produce a warming effect with no skin irritation that has not heretofore been attained. Further, the warming effect obtained by the present invention lasts long.

[0063] While the invention has been described in detail and with reference to specific embodiments thereof, it will

TABLE 3

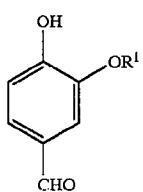
Formulation (%)	Example 8	Example 9	Compara. Example 9	Compara. Example 10	Compara. Example 11
VBE	0.005	0.005	—	—	0.005
CA-10	0.005	—	0.005	—	—
TPG-1	—	0.005	—	0.005	—
95% Ethanol	5	5	5	5	5
Nicol HCO-60	2	2	2	2	2
Glycerin	10	10	10	10	10
Sodium benzoate	0.05	0.05	0.05	0.05	0.05
Purified water	82.94	82.94	82.945	82.945	82.945
Effect					
Sensation during washing	comfortable tingling	comfortable tingling	nothing felt	nothing felt	comfortable tingling
Sensation after 30 mins.	warmth in the throat	warmth in the throat	nothing felt	nothing felt	almost nothing felt
Sensation after 1 hr.	warmth in the throat	warmth in the throat	nothing felt	nothing felt	nothing felt
Irritation	comfortable irritation	comfortable irritation	no irritation	no irritation	comfortable irritation

be apparent to one skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope thereof.

[0064] This application is based on Japanese patent application No. 2000-376814 filed Dec. 12, 2000, the entire contents thereof being hereby incorporated by reference.

What is claimed is:

1. A warming composition for food and drink and for oral care preparations which comprises a cooling agent and a compound represented by formula (I):

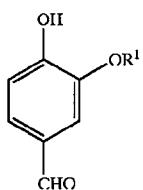


(I)

wherein R<sup>1</sup> represents a hydrogen atom, a methyl group or an ethyl group.

2. A warming composition for food and drink and for oral care preparations which comprises a cooling agent and a warming agent.

3. A warming composition for food and drink and for oral care preparations which comprises a cooling agent, a compound represented by formula (I):

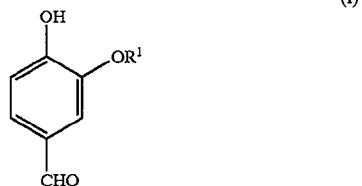


(I)

wherein R<sup>1</sup> represents a hydrogen atom, a methyl group or an ethyl group, and a warming agent.

4. A food, a beverage or an oral care preparation comprising the warming composition for food and drink or for oral care preparations according to any one of claims 1 to 3.

5. A food, a beverage or an oral care preparation according to claim 4, wherein said cooling agent, said compound represented by formula (I)



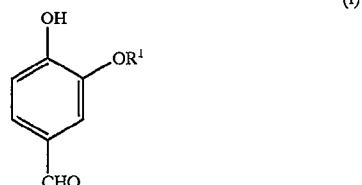
(I)

or said warming agent is present in an amount of 0.000001 to 10% by weight based on the weight of the total composition.

6. A flavor composition for food and drink or for oral care preparations which comprises the warming composition according to any one of claims 1 to 3.

7. A food, a beverage or an oral care preparation comprising the flavor composition for food and drink or for oral care preparations according to claim 6.

8. A food, a beverage or an oral care preparation according to claim 7, wherein said cooling agent, said compound represented by formula (I)



(I)

or said warming agent is present in an amount of 0.000001 to 10% by weight based on the weight of the total composition.

\* \* \* \* \*

# **EXHIBIT D**



US00PP08645P

## United States Patent [19]

Sturtz

[11] Patent Number: Plant 8,645

[45] Date of Patent: Mar. 15, 1994

[54] LOW MENTHOL MINT PLANT *MENTHA SPICATA* L. 'EROSPICATA'

[75] Inventor: George D. Sturtz, Albany, Oreg.

[73] Assignee: Aromatics, Inc., Salem, Oreg.

[21] Appl. No.: 968,031

[22] Filed: Oct. 27, 1992

[51] Int. Cl. 5 A01H 5/00

[52] U.S. Cl. Plt./100

[58] Field of Search Plt. 100

## [56] References Cited

## U.S. PATENT DOCUMENTS

4,354,035 10/1982 Christ et al. ..... 560/75  
5,017,397 5/1991 Nguyen et al. ..... 426/542

## OTHER PUBLICATIONS

Guenther, "The Chemistry, Origin and Function of Essential Oils in Plant Life," The Essential Oils 1:17, 224-225, 390-392, 412-415 (1948).

Murray and Reitsema, "The Genetic Basis of the Ketones, Carvone, and Menthone in *Mentha crispa* L.," J.

of American Pharmaceutic Association, Scientific Edition XLIII:612-613 Oct. 1954.

Murray, "The Genetic Basis for the Conversion of Menthone to Menthol in Japanese Mint," Genetics 46:925-929 (Jul. 1960).

Murray, "The Genetic Basis for a Third Ketone Group in *Mentha Spicata* L.," Genetics 46:931-937 (Jul. 1960).

Tucker et al., "The Origin of *Mentha* *Gracilis* (Lamiaceae). II. Essential Oils," Economic Botany 45:200-215 (1991).

Primary Examiner—James R. Feyrer

Assistant Examiner—Erich E. Veitenheimer

Attorney, Agent, or Firm—Klarquist Sparkman

Campbell Leigh & Whinston

## [57] ABSTRACT

A novel *Mentha spicata* mint plant characterized by its resistance to verticillium wilt and mint rust, and an essential oil with a relatively low l-menthol content and high menthone content. The oil, which has at most only minor amounts of piperitone and l-carvone, is characterized by peppermint-like taste and a hot odor.

2 Drawing Sheets

## 1

The present invention relates to a new and distinct variety of mint plant of the species botanically known as *Mentha spicata*. I have named by new variety "Erospicata."

I discovered my new variety as a chance seedling from a self pollination of a parent plant *M. spicata* L. var *crispata* Schrad. The seedling was grown in a cultivated area of my nursery in Oregon. My attention was first directed to the new plant because of its hot smell. I further observed disease resistance of this plant to verticillium wilt and mint rust. Analysis of the oil of this plant showed that it was quite unusual and distinct from other *M. spicata*.

Close observations of the new seedling and continued observations of progeny thereof subsequently asexually propagated under my direction on land near Corvallis, Oreg., by rooting cuttings, has confirmed that the unique characteristics of my new variety are a result of a seedling variation. I am therefore convinced that my new mint plant represents a new and improved variety of *Mentha spicata*, as particularly evidenced by the following unique combination of characteristics, which have proven firmly fixed, or outstanding, and which distinguish it from all other varieties of this species.

1. Low l-menthol content and high menthone content as compared to the oil of its *Mentha spicata* parent.
2. Only minor amounts of piperitone and l-carvone in the oil produced by the plant.
3. Disease resistance to verticillium wilt and mint rust.
4. A hot odor as opposed to the cool odor of its parent.

The accompanying photographs depict the color of my new variety of mint plant as nearly true as is reasonably possible to make the same in a color illustration of this character.

## 2

FIG. 1 is a color photograph of a plant of the present invention.

FIG. 2 is an enlarged photograph showing a leaf of the plant of FIG. 1.

One of the primary distinguishing features of my new mint plant over other mint plants of this species is that it has a characteristic peppermint taste and smell, yet its oil contains much lower levels of menthol and much higher levels of menthone. The *M. spicata* plant of the present invention produces an essential oil with an l-menthol content of less than about 5% by weight, a piperitone content of less than about 2%, and has more than about 50% l-menthone, and is substantially free of l-carvone. The essential oil, preferably comprises less than about 1% by weight l-menthol, less than about 1% piperitone, and at least 50% l-menthone. In particularly preferred embodiments, the essential oil comprises 55-60% l-menthone, less than about 1% l-menthol, less than about 1% piperitone, and is substantially free of l-carvone, menthofuran, menthyl acetate, and trans-sabinene hydrate. The oil contains sufficient amounts of menthone that it has the organoleptic properties of peppermint oil.

The low menthol content of the essential oil is important because menthol is an alcohol that irritates nasal, oral and gastrointestinal epithelium. Hence only very small amounts of conventional peppermint oil can be added to ingestible products such as candy. The plant of the present invention has retained sufficient menthone content to provide a "hot" peppermint taste and odor, but menthol is substantially absent from the oil. The absence of this alcohol helps avoid nasal and gastrointestinal irritation, while the menthone provides peppermint-like organoleptic properties. My new mint plant also expresses an oil that is low in carvone and piperitone content. The substantial absence of carvone and

# Plant 8,645

3

piperitone is important because these substances provide a taste that is organoleptically undesirable in peppermint oil. Carvone provides a spearmint taste, while piperitone imparts a bitter taste.

The mint plant of the present invention has an essential oil that, when analyzed by gas chromatographic analysis, includes the following weight percentages of menthone, carvone, menthol and piperitone:

1-menthone	>40
d-isomenthone	>15
carvone	<.01
1-menthol	<1
piperitone	<1

An example of the plant of the present invention is deposited with the U.S.D.A. National Clonal Germplasm Repository in Corvallis, Oreg., under accession number MEN625.

## Strain 86-183

The Erosipata variety is referred to herein as strain 86-183. Strain 86-183 relates to a new variety of mint plant originating as an  $S_1$  selection from the self-pollination of a clonal strain of *M. spicata* L. The parent plant of strain 86-183 is a wild spearmint obtained from the National Germplasm Repository in Corvallis, Oreg., under accession no. MEN57. This parent strain was originally numbered 71-62 by the originator, Dr. J. M. Murray, of the A. M. Todd Co. in Kalamazoo, Mich. Clone 71-62 was called *M. crispa* L. or *M. spicata* L. var *crispata* Schrad. It is a fertile allotetraploid plant with a chromosome number of 48. The 71-62 plant is resistant to verticillium wilt (*Verticillium albo-atrum*) and is believed to be immune to mint rust (*Puccinia menthae*). The 71-62 strain is glabrous and yields an essential oil containing about 70% of the ketone carvone, and less than 1% menthol, but it also has less than 1% menthone. It therefore lacks the odor or taste of peppermint that would be provided by menthol or menthone, yet has the spearmint odor and taste provided by carvone. The leaves are crisped or ruffled, hence the original name *crispa*. It has been shown that carvone-odored *M. crispa* has a genotype that segregates 16 spearmint in a 12 high carvone: 3 high menthone: 1 high piperitone ratio in the  $S_1$  progeny. A major consideration in the use of the wild spearmint parent, *M. crispa* (71-62), was its excellent resistance to verticillium wilt and leaf rust.

## General Objectives of this Breeding Program

The broad objectives of this breeding program were to try bring together in one plant the characteristics deemed necessary for a successful commercial essential oil crop. The two most important traits were disease resistance to wilt and rust, and an essential oil high in the major peppermint flavor components and low in undesirable compounds. High vigor and aggressive stolon development were also considered desirable traits. The parent plant (71-62) met the criteria of disease resistance and vigor.

## Breeding Program History

The parent plant (71-62) was self pollinated in the summer, and seeds from that plant were sown in a greenhouse in the following spring. Approximately 400 seedlings were selected and grown in 1  $m^2$  plots for three years. The plots were watered, weeded and fertilized alike and mowed at flowering to maintain clonal

4

purity. Plots were initially screened for menthone types by organoleptic methods, primarily by detecting a characteristic menthone odor. Approximately 70 plots had at least some menthone odor, but most were discarded for undesirable traits such as disease susceptibility or a "cool" menthol sensation upon organoleptic sampling. Plot number 86-183 was selected as a superior plant due to its vigorous growth habits and odor quality, having a sweet and hot odor. Subsequent chromatographic analysis of the essential oil revealed that the oil contained at least approximately 70% of the ketone menthone, which includes its isomers such as 1-menthone and d-isomenthone. No disease was evident in the three years of tests with this strain.

This strain (86-183) was vegetatively propagated and grown in a 3  $m^2$  plot in two subsequent years to study oil yield, quality and disease resistance. Then it was grown on several 0.5 hectare plots by farmers in Oregon's Willamette Valley and Madras, Oreg., to study the effects of site and harvest times on oil yield and quality.

## A Taxonomic Description of Strain 86-183

Strain 86-183 is a herbaceous perennial, becoming woody at the base of the stems late in the growing season. It has upright stems from the tips of horizontal rhizomes which spread vigorously in a lateral direction during the fall, winter, and early spring. Field grown plants may attain a height of 1 meter, but more commonly 6-8 cm. Herbage is glaborous except for some hairs on the veins on the lower surface of the leaves and the calyx teeth. Leaves are sessile, lanceolate, serrate (8-10 teeth on each side), and occasionally crisped. The largest cauline leaves are up to 7 cm long and 2.5 cm wide. Stems are branched in the upper portions with terminal, slender, leafless spikes of many (12-15) whorls of small flowers. Flower clusters (whorls) are subtended by a pair of lanceolate to linear bracts, the lower whorls being somewhat remote. Mature (containing mature nutlets) calyces are approximately 2.0 mm long, the upper portion dissected into 5 teeth that are less than 1 mm long with marginal and terminal trichomes (hairs). Five petals are fused into a two-lipped corolla that is pale lavender with darker splotches. The stigma is two-lobed and exserted. Fruits are small (less than 1 mm) dark brown nutlets, four per calyx. The chromosome number is  $2n=48$ .

The R.H.S. (Royal Horticultural Society) color of the top of the leaf is Green group 139A, while the bottom of the leaf is Green group 137C. The lavender flowers are Purple group 76C.

Strain 86-183 was very resistant to verticillium wilt and leaf rust when planted in wilt infected fields of the Willamette Valley. Only 0-3 plants in a field of 2000 plants were observed to develop these diseases in one trial. This resistance was apparently inherited from the parent (71-62) which is also highly resistant to these diseases. To demonstrate the disease resistance of strain 86-183, field trials were planted Apr. 3, 1992, in Talbot, Oreg. Two thousand plants of strain 86-183 were evaluated for mint rust (*Puccinia menthae*) and verticillium wilt (*Verticillium albo-atrum*). No incidence of rust or verticillium wilt were noted between Jun. 1, 1992, and Oct. 1, 1992.

Strain 86-183 has very aggressive stolons, growing under the soil surface, thereby providing the plant with protection from adverse weather conditions and mechanical damage.

Essential oils were obtained from the parent plant (71-62) and the strain of the present invention (86-183). The essential oil yield of strain 86-183 varies with climatic, cultural and other environmental factors. Willamette Valley trials in 1992 produced oil yields of at least 112 kg/hectare. Essential oils were obtained by steam distillation of the volatile oil of the plants using a method described in the publication *Mint Farming*, Agricultural Research Service, USDA (1963). The essential oil was then analyzed by GC/MS/DS using a Finnigan 1015C MS (mass spectrometer) interfaced by a glass-jet helium separator to a Varian 1400 GC (gas chromatograph). The glass GC column was obtained from Supelco Inc.; it was 0.75 mm ID and 60 M in length. The liquid phase was a 1 micron chemically bonded layer of Supelcowax 10 (functionally equivalent to Carbowax 20M). Samples were injected neat (without splitting). The GC injector was 220° C. and the GC column was held at 80° C. for 5 minutes, and then programmed to increase at 2° C./min to 190° C. Since some components co-eluted on the Supelcowax 10 column, the oil was also run on a non-polar (Supelco SPB-1; methyl silicone) glass column of exactly the same dimensions, and using the same temperature program as before, but the injection temperature was now 230° C.

Data was acquired and processed using a Riber 400 data system. Off-line file searching using an IBM-AT made use of a database file named KOVATS that was created under the PARADOX program from Borland International. The KOVATS database contains Kovats indices for two GC liquid phases, as well as the MW and the six most abundant ions in the mass spectrum.

Some of the components identified in the essential oil are listed in Table 1:

TABLE 1

Weight percent composition of the essential oils of <i>Menta spicata</i> L. strains 71-62 and 86-183		
Constituent	Parent (71-62)	Strain (86-183)
*l-menthone	0.94	58.80
*d-isomenthone	0.05	17.30
*l-carvone	71.60	<0.01
*beta caryophyllene	4.27	0.04
l-menthol	0.32	0.05
*germacrene D	0.03	5.41
piperitone	<0.01	0.20

\*notable differences in the composition of the oils from strains 71-62 and 86-183.

These results show that 86-183 differs from 71-62 in several important respects. Strain 86-183 is higher in essential oil content of l-menthone and d-isomenthone. Most notably, strain 86-183 has a much higher l-menthone content (58.8% vs. 0.94%), d-isomenthone content (17.30 vs. 0.05%), a lower l-menthol content (0.05% vs. 0.32%), and is substantially free of carvone as compared to the 71.6% carvone content of strain 71-62. The total menthone content (d-isomenthone and l-menthone) of strain 86-183 is greater than 75% (i.e., 76.1%). Strain 86-183 also has less than about 6% germacrene D, compared to less than 1% in strain 71-62.

Gas chromatographic analysis was also performed on a second sample from another plant of strain 86-183, and the results are shown in Table 2 below.

TABLE 2

Gas Chromatographic Analysis of Essential Oil From a Sample of Strain 86-183, by Weight Percent		
	1-menthone	56.32
d-isomenthone		16.64
l-carvone		<0.01

TABLE 2-continued

Gas Chromatographic Analysis of Essential Oil From a Sample of Strain 86-183, by Weight Percent	
l-menthol	0.17
germacrene D	6.47
piperitone	1.15

For comparison, gas chromatographic analysis was performed on spearmint oil obtained from a *Mentha spicata crispa* Scotch plant, in this case some Farwest Scotch Spearmint Oil, 1991 crop, obtained from Aromatics, Inc., of Salem, Oreg.

TABLE 3

Gas Chromatographic Analysis, by Weight Percent of Selected Components of Spearmint Oil as Comparison	
l-menthone	0.77
d-isomenthone	0.13
l-menthol	0.01
l-carvone	64.93

The essential oil of this spearmint plant was essentially free of menthol and menthone (less than 1% of each), but was high in l-carvone concentration (more than about 60%) which gave the oil the organoleptic properties of spearmint.

As a further comparison, a gas chromatographic analysis was performed on peppermint oil obtained from a conventional *Mentha piperata* plant Murray Mitchum, in this case peppermint oil from Aromatics, Inc., of Salem, Oreg.

TABLE 4

Gas Chromatographic Analysis, by Weight Percent, of Selected Components of Peppermint Oil as Comparison	
l-menthone	22.24
d-isomenthone	3.01
l-menthol	42.48
piperitone	0.58

This peppermint oil contains characteristically high concentrations of l-menthol and l-menthone. It includes more than 40% l-menthol and more than 20% l-menthone. This level of menthone provides a characteristic peppermint taste, but the presence of l-menthol in more than trace amounts (e.g., more than 1% or 2%) provides a "cool" organoleptic sensation and produces mucosal irritation.

To demonstrate the consistently high level of carvone in spearmint oil (*Mentha spicata* native), a gas chromatographic analysis was also performed on Farwest Native Spearmint Oil from Aromatics, Inc., of Salem, Oreg.

TABLE 5

Gas Chromatographic Analysis, by Weight Percent, of Selected Components of Farwest Native Spearmint Oil *** Concentration = Relative Area % ***	
l-menthone	0.03
d-isomenthone	0.05
l-menthol	0.18
l-carvone	59.48

This spearmint oil contains characteristically low concentrations (less than 1%) of menthone and menthol, but is very high in carvone content. The oil has more than 50% l-carvone, which gives it a strong characteristic spearmint taste.

## Plant 8,645

7

## Distinguishing Characteristics of Strain 86-183

Some of the distinguishing characteristics of the essential oil of strain 86-183 are shown in the following Table 6, which compares that oil to peppermint oil and spearmint oil, and Clone 199 that was described by Tucker in *Economic Botany* 45(2):200-215 (1991).

TABLE 6

Oil Compounds	Comparison of Peppermint Oil, Spearmint Oil and Essential Oil of Strains 86-183 and Spic-199			
	86-183	Peppermint	Spearmint	Spic-199
l-menthol	1% Max	35-45%	0%	0%
l-carvone	1% Max	0%	50%-70%	0%
menthyl acetate	1% Max	3-5%	.01-.10%	.13%
l-menthone	50-60%	18-20%	.03-1.0%	51.73%
piperitone	2% Max	.10-1%	0%	10.65%

Some of the morphological characteristics that distinguish strain 86-183 from Spic 199 are set forth in Table 7:

10

15

20

25

30

35

40

45

50

55

60

65

8

TABLE 7

A Morphological Comparison of Spic 199 and Strain 86-183		
	Spic-199	Strain 86-183
5 Leaf blade	flat	may be crisped
Leaf shape	lanceolate	lanceolate
Leaf attachment	petiole 0.5 cm long	sessile (no petiole)
Leaf margin	serrate	serrate
Leaf length	longest 5 cm	longest 7 cm
Leaf width	<2 cm	2.5 cm (greater than 2 cm)
Hairness	occasional hair on veins otherwise glabrous	veins hairy, otherwise glabrous
Plant color	dark green with purple stems and veins	light green, no other coloration
Plant height	<5 dm	6-8 dm to 1 meter
Chemotype	menthone, 10% piperitone	menthone, <1% piperitone

I claim:

1. A new and distinct variety of a disease-resistant mint plant, substantially as shown and described, characterized particularly as to novelty by its production of an oil with a relatively low l-menthol content and high menthone content, when compared to the oil of its *Mentha spicata* parent, and at most only minor amounts of piperitone and l-carvone, said oil having a peppermint-like taste and a hot odor.

\* \* \* \* \*

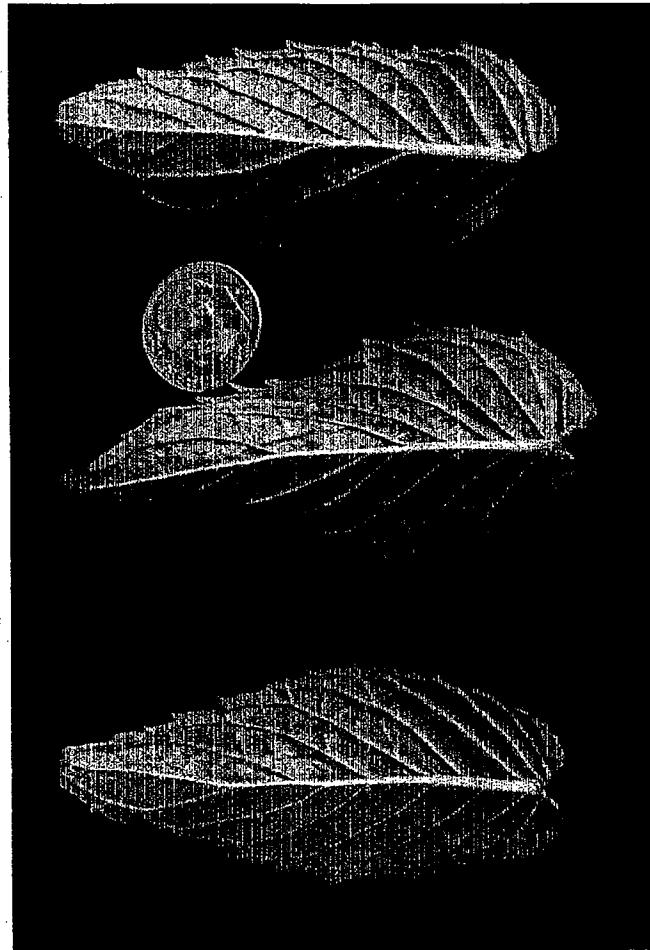


FIG. 2

U.S. Patent

Mar. 15, 1994

Sheet 2 of 2

Plant 8,645



FIG. 1